

## **REMARKS/ARGUMENTS**

### **Introductory Comments**

Reconsideration of this application is respectfully requested. Claims 31-57 are currently pending and stand rejected in the application.

Any reference to the “Office Action” refers to the office action dated December 13, 2005.

### **Rejections Under 35 U.S.C. § 102(e)**

In the office action dated May 19, 2004, claims 31-45, and 47-55 stand rejected under 35 U.S.C. §102(e) as anticipated by US 2001/0009066 of Bhatt, et al. (hereinafter ‘Bhatt’). The office action asserts:

Bhatt discloses, referring to figure 12, a printed circuit board (PCB) comprising: a first signal routing layer (40) formed on a first surface fo the PCB; an electrically conductive layer (40) (see ([0033]), at least one padless via (12, see [0008]) extending from the first signal routing layer to the electrically conductive layer, (Office action, page 2, last paragraph).

Applicants respectfully submit the office action ignores that Figs. 10-12 of Bhatt explicitly depict, and paragraph 35 explicitly describes, pads (44) formed atop each via in the same operation that forms the layer of conductive metal (40). Therefore, applicants respectfully submit that Bhatt explicitly describes padded vias, not padless vias, and therefore cannot form a proper basis for a 35 USC 102(e) rejection of applicants’ independent claims.

‘A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.’ Verdegaal Bros. V. Union Oil Co. of California, 814 F.2d 628, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), (MPEP 2131).

Applicant's independent claim 31 recites, in part: "A printed circuit board (PCB) comprising: a first signal routing layer formed on a first surface of the PCB; an electrically conductive layer; at least one padless via extending from the first signal routing layer to the electrically conductive layer". At paragraph [0035], Bhatt explicitly recites, "Additive plating *also produces pads 44* with the diameter of the *pads* now capable of being approximately equal to the diameter of the landless, plated through holes", (emphasis provided). As depicted in figs. 10-12 and described by Bhatt, the pads (44) are formed onto the vias in the same operation as the 'fine-line circuitry', so Bhatt does not describe, even in an intermediate stage, applicants' recited claim limitation of "at least one *padless via* extending from the *first signal routing layer* to the electrically conductive layer".

Further, although the office action points to paragraph [0008] of Bhatt, stating "the invention herein also provides a printed circuit board and a method of producing a circuit board having landless, plated through holes", to assert that Bhatt discloses padless vias, Bhatt unmistakably distinguishes 'lands' from 'pads' in paragraph [0035] (quoted above), disclosing landless vias that explicitly and irrefutably possess pads (44), as also clearly depicted in figs. 10-12.

For at least the reason that Bhatt explicitly describes and depicts only conductive metal (40) and vias *with pads* (44), applicants respectfully submit that Bhatt fails to disclose at least the limitation of "at least one *padless via* extending from the *first signal routing layer* to the electrically conductive layer" in independent claim 31, as well as similarly disclosed in each of independent claims 36, 41, 47, and 54 as required for a proper 35 USC 102(e) rejection. Therefore, applicants respectfully request that the

rejections be withdrawn from independent claims 31, 36, 41, 47 and 54, as well as from claims 32-35 and 58, 37-40 and 59, 42-46 and 60, 48-53 and 61, and 55-57 and 62, which depend from and include the recited limitations of claims 31, 36, 41, 47 and 54, respectively.

### **Rejections Under 35 U.S.C. § 103(a)**

#### **Claims 35, 41-44, 46, 52 and 60**

In the office action, claims 35, 41-44, 46, 52 and 60 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bhatt, et al., in view of US 5,418, 689 (Alpaugh).

Applicants contend that the rejections are improper due to the failure to make out a prima facie case for obviousness as required under MPEP 2142:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest *all the claim limitations*, (emphasis provided).

The office action asserts that Bhatt discloses the claimed invention with respect to claim 35, except that,

Bhatt does not specifically disclose a component attached to the PCB by a solder interconnection between a contact pad on a bottom surface of the component and the at least one padless via [claim 35]. However, it is well known in the art to attach components to PCB in this manner to vias as evidenced by Alpaugh (see col. 4, 50-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to attach a chip to the PCB in the invention of Bhatt., (office action, page 5, paragraph 3).

The office action also asserts that Bhatt discloses applicants' claim 41 except that,

“Bhatt does not specifically disclose a component attached to the PCB by a plurality of solder ball interconnections between the array of interconnections formed on the first surface of the PCB and a corresponding array of contact pads disposed on a bottom surface of the electronic component [claim 41]. However, it is well known in the art to attach components to PCB in this manner to vias as evidenced by Alpaugh (see col. 4, 50-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to attach a chip to the PCB in the invention of Bhatt, (office action page 6, paragraph 1).

The office action appears to assert that the disclosure in Bhatt as modified by Alpaugh to render obvious applicants’ claim 41, would also render obvious claims 42-43, 46, 52, and 60, (office action, page 6, paragraph 2), and that “it would have been obvious to one having ordinary skill in the art at the time of the invention to make the width [of the traces] 3 mils, (office action, page 7, paragraph 2).

All of these asserted 35 USC 103 rejections relying on the combination of Bhatt with Alpaugh must fail as improper, for, as discussed above regarding the asserted 35 USC 102(e) rejection, Bhatt fails to disclose at least applicants’ recited claim limitations of, “at least one *padless via* extending from the *first signal routing layer* to the electrically conductive layer” in independent claim 31 from which claim 35 depends, and “at least one *padless via* extending from the *first signal routing layer* to the at least one electrically conductive layer” in independent claim 41 from which claims 42-43, 46 and 60 depend. Alpaugh also fails to disclose this limitation, and so the combination of Bhatt and Alpaugh fails to establish a prima facie case of obviousness as required for a proper 35 USC 103(a) rejection.

#### **Claims 39-40**

The office action asserts claims 39 and 40 are unpatentable under 35 U.S.C. §103(a) over Bhatt in view of US 6,555,208 (Takada). Applicants contend that the rejections are

improper due to the failure to make out a prima facie case for obviousness as required under MPEP 2142 (*supra*).

The office action states that Bhatt discloses applicants claimed invention except that the office action relies upon Takada to provide disclosures absent from Bhatt that a “contact pad has a diameter of less than 18 mils [claim 39]”, (office action, page 7, last paragraph), and that a “padless via has a diameter of 12 mils or less [claim 40]”, (office action, page 8, paragraph 2). However, as discussed above, Bhatt also fails to disclose applicants recited claim limitation of “at least one *padless via* extending from the *first signal routing layer* to the at least one electrically conductive layer” in independent claim 36 from which claims 39 and 40 depend. As fully explained in the preliminary amendment submitted October 14, 2005, Takada utterly fails to disclose padless vias, but rather discloses vias with pads in every embodiment. Therefore, the combination of Bhatt with Takada likewise fails to disclose “at least one *padless via* extending from the *first signal routing layer* to the at least one electrically conductive layer”, and therefore also fails to establish a prima facie case of obviousness as required for a proper 35 USC 103(a) rejection.

#### **Claim 45**

The office action asserts claim 45 is unpatentable under 35 U.S.C. §103(a) over Bhatt in view of Alpaugh as applied to claim 41, and further in view of Takada, incorrectly asserting as above that the combination of Bhatt with Alpaugh discloses applicants’ recited independent claim 41 except that the combination fails to disclose a contact pad with a diameter of less than 18 mils, further asserting that Takada supplies this disclosure.

For all the reasons already articulated in the above sections, applicants contend that the rejections are improper due to the failure to make out a prima facie case for obviousness in as much as the cited references, both alone and in combination, fail to disclose at least applicants' claim limitation of "at least one padless via extending from the first signal routing layer" recited in independent claim 41 from which claim 45 depends. Therefore, contented above, applicants also contend that the cited references fail to establish a prima facie case of obviousness as required for a proper 35 USC 103(a) rejection as regarding claim 45.

#### **Claims 54-57 and 62**

The office action asserts claims 54-57 and 62 are unpatentable under 35 U.S.C. §103(a) over US 6,521,846 (Freda) in view of Bhatt. Applicants contend that the rejections are improper due to the failure to make out a prima facie case for obviousness as required under MPEP 2142 (supra).

The office action asserts that Freda discloses "a method . . . comprising at least one via (22) extending from a first signal routing layer on the first surface of the PCB to an electrically conductive layer (24)", and admits "Freda does not specifically state that the via is padless [claim 54]", but then incorrectly asserts "it is well known in the art to use padless vias in PCB as evidenced by Bhatt (see [0008])", (office action, page 9, last paragraph). As argued and demonstrated regarding the asserted 35 USC 102(e) rejection above, Bhatt completely fails to disclose padless vias. Bhatt, in the asserted paragraph [0008] states, "the invention herein also provides a printed circuit board and a method of producing a circuit board having *landless*, plated through holes", (emphasis provided),

but then distinguishes ‘lands’ from ‘pads’ in paragraph [0035], “Additive plating *also produces pads 44* with the diameter of the *pads* now capable of being approximately equal to the diameter of the landless, plated through holes”, showing pads 44 in figs. 10-12 located directly upon each via.

Therefore, as unmistakably set forth in Bhatt, pads and lands are distinguished, the vias of Bhatt being landless, but in each instance possessing pads. Padless vias are not disclosed anywhere in Bhatt, and so Bhatt completely fails to supply the asserted teaching admitted in the office action to also be missing from Freda. As such, the combination of Freda with Bhatt fails to disclose at least applicants’ claim limitation of “at least one padless via extending from a first signal routing layer on the first surface of the PCB” recited in independent claim 54. Likewise, the combination of Freda with Bhatt fail to disclose applicants’ claims 55-57 and claim 62 which depend from and include the limitations recited in independent claim 54. Therefore, applicants respectfully submit that the office action fails to meet the requirements to establish a *prima facie* case of obviousness under 35 USC 103(a).

### **Summary of Arguments Regarding 35 USC 103(a) Rejections**

As pointed out regarding the asserted 35 USC 103(a) rejections in each of the foregoing discussions, the combined references cited in the office action fail to meet the requirements for establishing a proper 35 USC 103(a) rejection as set forth by MPEP 2142, in as much as the cited references fail, both alone and in combination, to disclose at least one claim limitation in each of applicants’ the identified claims.

Therefore, applicants' respectfully request withdrawal of the 35 USC 103(a) rejections from each of claims 35, 39-46, 52, 54-57, 60 and 62.

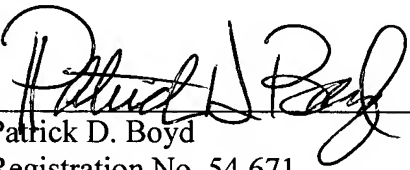
**CONCLUSION**

In light of the points and arguments set forth herein, applicants respectfully submit that the rejections have been properly overcome, and the claims are allowable as they stand.

Please charge any shortages and credit any overages to Deposit Account No. 02-2666.

Respectfully submitted,

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